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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/791,055	03/01/2004	Peter Brick	5367-71	2857

7590 06/15/2005  
COHEN, PONTANI, LIEBERMAN & PAVANE  
Suite 1210  
551 Fifth Avenue  
New York, NY 10176

EXAMINER

AL NAZER, LEITH A

ART UNIT PAPER NUMBER

2821

DATE MAILED: 06/15/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/791,055	<b>Applicant(s)</b> BRICK ET AL.	
	<b>Examiner</b> Leith A. Al-Nazer	<b>Art Unit</b> 2821	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
  - If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
  - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
  - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 01 March 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 March 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>03/01/04, 04/01/04</u> . | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Drawings***

1. The drawings are objected to because reference numbers 14 and 16 are each used to designate two different elements in figure 4. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Specification***

2. The disclosure is objected to because of the following informalities:

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- a. Reference number 13 shown in figure 4 is not addressed in the specification.
- b. On page 12 of the specification, reference number 16 is used to refer to two separate elements, namely a "pump laser" and a "cladding layer".

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1, 3, 4, 15, and 16 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. patent no. 5,684,817 to Houdre et al.

With respect to claim 1, Houdre teaches a semiconductor laser with a semiconductor body (figure 3a), including a laser resonator (G1-Gn in figure 3a), comprising a plurality of discontinuities formed in a first region of the semiconductor body and arranged such that radiation generated by the semiconductor laser cannot propagate therethrough, and a second region of the semiconductor body constituting the laser resonator, the second region having none of the discontinuities formed therein, to enable propagation therethrough of radiation generated by the semiconductor laser (figure 3a).

Claim 3 requires the discontinuities be filled with a filling material, the refractive index of which differs from the refractive index of the semiconductor body. Although not explicitly stated, it is inherent that the discontinuities in the system of Houdre would at least be filled by air molecules, which is a "filling material" that has a refractive index that differs from the refractive index of the semiconductor body (column 2, lines 47-50).

With respect to claim 4, Houdre teaches the semiconductor regions adjoining a filling material, the refractive index of which differs from the refractive index of the semiconductor regions (column 2, lines 47-50).

With respect to claim 15, Houdre teaches the discontinuities comprising a periodic arrangement of cutouts (figure 3a; column 2, lines 37-60).

With respect to claim 16, Houdre teaches the discontinuities comprising a periodic arrangement of semiconductor regions (figure 3a; column 2, lines 37-60).

5. Claims 1 and 3-16 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. patent no. 5,784,400 to Joannopoulos et al.

With respect to claims 1 and 10, Joannopoulos teaches a semiconductor laser with a semiconductor body, including a laser resonator (1204), comprising a plurality of discontinuities formed in a first region of the semiconductor body and arranged such that radiation generated by the semiconductor laser cannot propagate therethrough (figure 12), and a second region of the semiconductor body constituting the laser resonator, the second region having none of the discontinuities formed therein, to

enable propagation therethrough of radiation generated by the semiconductor laser (figure 12).

Claims 3 and 8 require the discontinuities be filled with a filling material, the refractive index of which differs from the refractive index of the semiconductor body. Although not explicitly stated, it is inherent that the discontinuities in the system of Joannopoulos would at least be filled by air molecules, which have a refractive index that differs from the refractive index of the semiconductor body.

With respect to claims 4 and 9, Joannopoulos teaches the semiconductor regions adjoining a filling material, the refractive index of which differs from the refractive index of the semiconductor regions.

With respect to claim 5, Joannopoulos teaches an optically pumped semiconductor device with a vertical emitter (1202) comprising a quantum well structure, wherein the quantum well structure of the vertical emitter is optically pumped by at least one semiconductor laser (1204) as claimed in claim 1.

With respect to claim 6, Joannopoulos teaches an optically pumped semiconductor device with a vertical emitter (1202) comprising a quantum well structure wherein the quantum well structure of the vertical emitter is pumped by a plurality of semiconductor lasers as claimed in claim 1, at least one of the semiconductor lasers (1204) having a resonator with an angled or curved resonator axis.

With respect to claim 7, Joannopoulos teaches an optically pumped semiconductor device with a vertical emitter (1202) comprising a quantum well structure, and with a pump radiation source (column 6, lines 8-28), which generates

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radiation for optically pumping the quantum well structure, comprising a waveguide (1204) for coupling the pump radiation into the quantum well structure, wherein the waveguide is laterally delimited at least partly by a plurality of discontinuities arranged in such a way that the pump radiation is not capable of propagating within the arrangement (figure 12).

With respect to claim 11, Joannopoulos teaches the vertical emitter and the semiconductor laser being grown epitaxially on a common substrate (figure 12).

With respect to claim 12, Joannopoulos teaches the pump radiation source being grown epitaxially on a common substrate (figure 12; column 6, lines 8-28).

With respect to claims 13 and 15, Joannopoulos teaches the discontinuities comprising a periodic arrangement of cutouts (figure 12).

With respect to claims 14 and 16, Joannopoulos teaches the discontinuities comprising a periodic arrangement of semiconductor regions (figure 12).

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

7. Claims 1-4, 15, and 16 are rejected under 35 U.S.C. 102(a) as being anticipated by U.S. patent no. 6,416,575 to Yamada.

With respect to claim 1, Yamada teaches a semiconductor laser with a semiconductor body, including a laser resonator (18), comprising a plurality of

discontinuities formed in a first region of the semiconductor body and arranged such that radiation generated by the semiconductor laser cannot propagate therethrough (figure 4), and a second region of the semiconductor body constituting the laser resonator, the second region having none of the discontinuities formed therein, to enable propagation therethrough of radiation generated by the semiconductor laser (figure 4).

With respect to claim 2, Yamada teaches the resonator having an angled or curved resonator axis (figure 1).

With respect to claim 3, Yamada teaches the discontinuities being filled with a filling material, the refractive index of which differs from the refractive index of the semiconductor body (figure 4; column 7, lines 10-45).

With respect to claim 4, Yamada teaches the semiconductor regions adjoining a filling material, the refractive index of which differs from the refractive index of the semiconductor regions.

With respect to claim 15, Yamada teaches the discontinuities comprising a periodic arrangement of cutouts (figure 4).

With respect to claim 16, Yamada teaches the discontinuities comprising a periodic arrangement of semiconductor regions (figure 4).

### ***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:



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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining

obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

10. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S.

patent no. 5,684,817 to Houdre et al. in view of U.S. patent no. 6,134,369 to Kurosawa or U.S. patent no. 6,898,362 to Forbes et al.

Claim 2 requires the resonator have an angled or curved resonator axis. Such configurations are well known in the art, as is evidenced by Kurosawa (figures 2-5) and Forbes (figure 6C). At the time of the invention, it would have been obvious to one having ordinary skill in the art to utilize the curved configuration of Kurosawa or Forbes in the system of Houdre. The motivation for doing so would have been to make the structure more compact and allow it to be fabricated on a substrate of a desired size.

11. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S.

patent no. 5,784,400 to Joannopoulos et al. in view of U.S. patent no. 6,134,369 to Kurosawa or U.S. patent no. 6,898,362 to Forbes et al.

Claim 2 requires the resonator have an angled or curved resonator axis. Such configurations are well known in the art, as is evidenced by Kurosawa (figures 2-5) and Forbes (figure 6C). At the time of the invention, it would have been obvious to one having ordinary skill in the art to utilize the curved configuration of Kurosawa or Forbes in the system of Joannopoulos. The motivation for doing so would have been to make the structure more compact and allow it to be fabricated on a substrate of a desired size.

#### ***Communication Information***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leith A. Al-Nazer whose telephone number is 571-272-1938. The examiner can normally be reached on Monday-Friday, 7:30-4:00.

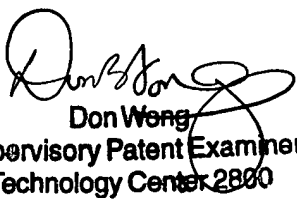
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Don Wong can be reached on 571-272-1834. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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LA

  
Don Wong  
Supervisory Patent Examiner  
Technology Center 2800